

Remarks

This amendment is submitted in response to the Office Action dated May 8, 2003. Reconsideration and allowance is requested.

In this Office Action, a request was made for more formalized drawings; therefore, these drawings are attached.

Claims 1,2,6 and 16-20 were rejected as obvious over Parsonneault, U.S. 5,678,929 taken with Ide, U.S. 5,459,674. The remaining claims are indicated to be allowable. Upon review of the claims and the reasons for allowance posted by the Examiner, it was concluded that the most efficient prosecution of the application would be to accept the allowed claims. Therefore, claim 4 now is rewritten to include claim 1; this is because the reasons for indicating Allowability of claim 4 were all included in claim 4. Claim 5 is rewritten to include claim 1, and numbered claim 1. Claims 6 and 7 were combined and rewritten to include claim 1, all as claim 6.

The allowance of claims 8 through 15 is gratefully acknowledged.

As to claims 16-20 and new claims 21, 22 and 23, the introduction of each claim has been modified to indicate that apparatus is being provided for measuring the topology of at least one surface of a bearing. As is evident from the use of means plus function terminology in claim 16, it can be seen that claim 16 and the claims which depend thereon each recites means for measuring surface topology and means for determining the dimensions of features disposed on the surface. These claims read on the apparatus which is needed to carry out the steps which I recited in allowable claims 1, 4, and 6. Therefore, since means plus function claims are to be read upon the features described in the specification and insubstantial variations thereof, then clearly these claims must also be considered to be allowable, and such action is respectfully requested.

If any matters can be handled by telephone, Applicant requests that the Examiner telephone Applicant's attorney at the number below.

The Commissioner is authorized to charge any additional fees to Deposit Account No. 20-0782 (Order No. STL 3090).

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A method for characterizing the topology of one or more hydrodynamic bearing surfaces, comprising;
rotating the one or more hydrodynamic bearings;
measuring the surface of the one or more hydrodynamic bearings;
determining at least one reference plane; and
establishing at least one dimension of at least one [feature] groove disposed on the one or more hydrodynamic bearing surfaces[.], including determining a ratio of a width of at least one hydrodynamic groove to the distance between the at least one hydrodynamic groove and at least one adjacent hydrodynamic groove.
2. (Cancel).
3. (Cancel).
4. (Amended) A method for characterizing the topology of one or more hydrodynamic bearing surfaces, comprising;
rotating the one or more hydrodynamic bearings;
measuring the surface of the one or more hydrodynamic bearings;
determining at least one reference plane; and
establishing at least one dimension of at least one [feature] groove disposed on the one or more hydrodynamic bearing surfaces[.], including determining at least one of a width, a depth, and a position of the at least one hydrodynamic groove with respect to the at least one reference plane.
5. (Cancel).

6. (Amended) A method for characterizing the topology of one or more hydrodynamic bearing surfaces, comprising:

rotating the one or more hydrodynamic bearings;

measuring the surface of the one or more hydrodynamic bearings;

determining at least one reference plane; and

establishing at least one dimension of at least one [feature] groove disposed on the one or more hydrodynamic bearing surfaces[.], including establishing the dimensions of at least one feature including determining the reference plane from data acquired during the measuring of the surface of the one or more hydrodynamic bearings and establishing the dimensions of the at least one feature, including establishing a distance from the reference plane wherein the distance defines a leading edge or trailing edge of at least one hydrodynamic groove.

7. (Cancel).

8. (Original) A method for analyzing the surface of a hydrodynamic bearing of a disc drive having hydrodynamic grooves, comprising:

rotating the hydrodynamic bearing about a longitudinal axis;

during rotation, measuring the surface topology of the hydrodynamic bearing;

and

determining the angular position of the hydrodynamic grooves along the circumference of the hydrodynamic bearing with respect to the longitudinal axis.

9. (Original) The method of claim 8, further comprising determining at least one of a depth dimension and a width dimension of the hydrodynamic grooves.

10. (Original) The method of claim 8, further comprising determining the ratio of a width dimension of a first hydrodynamic groove to an angular distance between one or more hydrodynamic grooves adjacent the first hydrodynamic groove.

11. (Original) The method of claim 8, wherein the hydrodynamic grooves comprise sinusoidal hydrodynamic grooves, herringbone hydrodynamic grooves, helix hydrodynamic grooves, and combinations thereof.

12. (Original) The method of claim 8, wherein measuring the surface topology of the hydrodynamic bearing comprises determining at least one edge of the hydrodynamic grooves.

13. (Original) The method of claim 12, wherein determining at least one edge of the hydrodynamic grooves comprises establishing a least squares reference plane associated with data derived during measuring, then providing a user defined distance from the least squares reference plane defining the upper boundary of the at least one edge of the hydrodynamic grooves.

14. (Original) The method of claim 8, wherein determining the angular position of the hydrodynamic grooves comprises defining a bisector of a measured width distance for the hydrodynamic grooves as a position about midway the measured width distance.

15. (Original) The method of claim 14, further comprises determining a depth of the hydrodynamic grooves wherein the depth is defined as the distance from a reference plane to at least two points intersecting the edge of the hydrodynamic grooves about equidistant from the longitudinal axis and about centered about the bisector.

16. (Amended) [A method] Apparatus for measuring the topology of at least one surface of a hydrodynamic bearing disposed about a shaft on a disc drive, comprising:
means for measuring the surface topology; and
means for determining the dimensions of features disposed upon the surface.

17. (Amended) The [method] apparatus of claim 16, wherein the features include at least one hydrodynamic groove.

18. (Amended) The [method] apparatus of claim 16, wherein means for measuring the surface topology comprises a rotating means for rotating the hydrodynamic bearing about a longitudinal axis and a surface measuring means for measuring the surface topology.

19. (Amended) The [method] apparatus of claim 18, surface measuring means comprises an edge-detecting means for analyzing the data to determine at least one edge of at least one hydrodynamic groove disposed on the hydrodynamic bearing.

20. (Amended) The [method] apparatus of claim 16, wherein means for determining the dimensions of features comprises data processing means for processing data received from measuring the surface topology and an edge-detecting means for analyzing the data to determine at least one edge of at least one hydrodynamic groove disposed on the hydrodynamic bearing.

21. (New) The apparatus of claim 16 including means for determining a radio of a width of at least one hydrodynamic groove to the distance between the at least one hydrodynamic groove and at least one adjacent hydrodynamic groove.

22. (New) The apparatus of claim 16 including means for establishing the dimensions of at least one feature comprises determining the reference plane from data acquired during the measuring of the surface of the one or more hydrodynamic bearings and establishing the dimensions of the at least one feature comprises establishing a distance from the reference plane wherein the distance defines a leading edge or trailing edge of at least one hydrodynamic groove.

23. (New) The apparatus of claim 16 including means for determining at least one of a width, a depth, and a position of the at least one hydrodynamic groove with respect to the at least one reference plane.